# Model Building in Polaris: A Deeper Dive

Updated October 2025

**/**anaplan

Anaplan Polaris is our next-generation calculation engine.

Designed from the ground up for fast, highly dimensioned calculation at scale, Polaris represents a paradigm shift in your ability to model business planning challenges without compromise.

You can achieve significantly greater granularity of planning for more detailed decision-making with Polaris.

This deck is part of a series on Polaris best practices and includes a deep dive of some previously discussed topics, as well as new content.

<u>Click here</u> for more Community content or visit <u>Anapedia</u> for detailed technical guidance.

## **Topics Covered**

1 Iterative Development

Blueprint Insights: Better Together

Calculation Complexity

Calculation Effort

5 Guards and Inline Conditions

6 Inserting List Members

## **Iterative Development**

### An introduction to Iterative Development in Polaris

Polaris allows large-scale modeling, requiring phased validation to stay performant and manageable

## What is iterative development?

Iterative development is separating syntax validation from performance validation.

It means building and unit testing in one environment, evaluating scalability and performance in another, and iterating between the two throughout.

#### Why does it matter?

This development approach helps you build correct and performant models, while maintaining model builder productivity.

Following this approach using Anaplan's Application Lifecycle Management (ALM) establishes deployment discipline from the start.

#### What does it look like?

There are four main steps:

- Quick feedback, fast development
- Create a TEST model with fully populated lists (don't forget to put it in deployed mode!)
- 3. Start introducing data
- 4. Reality check with a fullscale test model

Read this 5-minute article for a closer look at iterative development.

## **Blueprint Insights: Better Together**

## **Getting the most out of Blueprint Insights**

Blueprint Insights can and should be used together to provide a holistic view into optimization opportunities

Gain insight into which line items can be optimized, helping you prioritize where to focus efforts to drive formula efficiency and model performance.

#### **Calculation Complexity**

Shows the effect of formulas in calculating cells

#### **Calculation Effort**

Displays the percentage of computational effort required for each line item

#### **Populated Cell Count**

Tells the size of the populated space - the cells that have non-default values

#### **Cell Count**

Shows the total size of the multi-dimensional space (the potentially addressable space)

## **Prioritizing Optimization Opportunities**

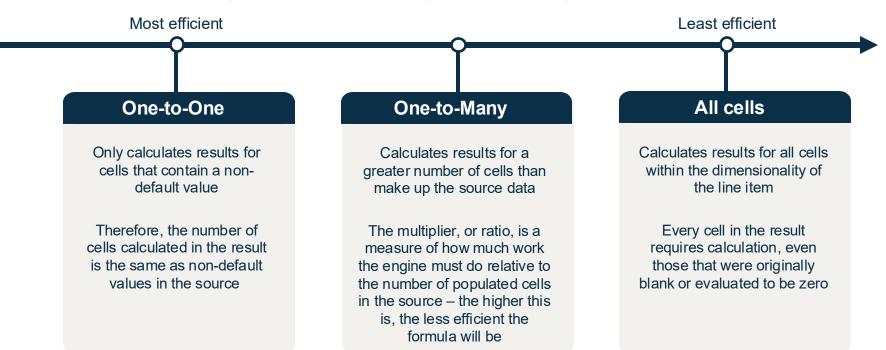
Review the below guidelines for prioritizing which formulas to optimize in a Polaris model. Then explore the remaining content for more detail about Calculation Complexity, Calculation Effort, and Using Guards Effectively to Optimize Calculations.

- Focus first on **high Calculation Effort** line items that also have **high Calculation Complexity**. These line items have the most room for improvement.
- Focus next on line items with **high Calculation Effort overall**, especially if they use known single-threaded functions like ISFIRSTOCCURRENCE, RANK, RANKCUMULATE, and CUMULATE.
- Focus next on high Calculation Complexity line items that also have high Cell Count. Even if they have a small Populated Cell Count and Calculation Effort, they have the potential to cause performance issues if the addressable Cell Count and Complexity is high.
- Finally, focus on line items with Calculation Complexities that equal 'All Cells' in line items with high cell counts as they may pose a risk due to their inherent fully dense nature.

## **Calculation Complexity**

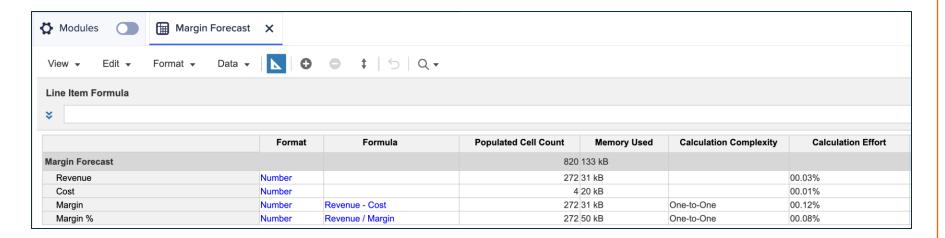
## The Calculation Complexity column shows the effect of your formula in calculating cells

Formulas should be designed to preserve sparsity to drive memory-efficient models



### 'One-to-One' Calculation Complexity: An example

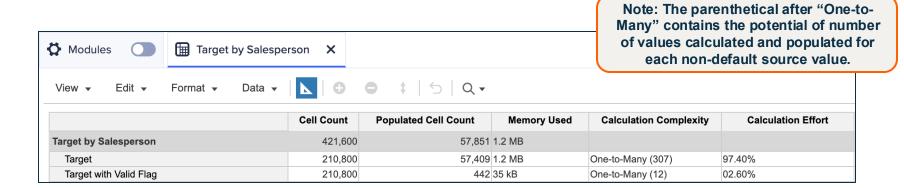
In this example, the Margin calculation is driven by the Revenue value and influenced by the Cost value, representing a one-to-one relationship. The one-to-one calculation complexity means one cell is calculated and potentially populated for each non-default value in the source.



One-to-one calculations are common, but there are other types of math, such as allocations, that do not follow this pattern.

## 'One-to-Many' Calculation Complexity: An example

The One-to-Many calculation arises when math is performed that differs dimensionally from the source data or involves allocations. The below example looks at the target by salesperson and explores two ways to write the formula.



Each line item results in the target by salesperson, but the formula is written two different ways.

CONSIDER: What do you notice about the cell counts, memory, complexity, and effort for each line item? Why might this be?

## 'One-to-Many' Calculation Complexity: An example (continued)

The initial (top) formula results in 307 potential values for every non-default value feeding it. By introducing a guard to the formula, in this case the 'IF' statement, the second (bottom) formula results in a complexity of 12, optimizing formula efficiency and reducing unnecessary calculations.

```
Target by Salesperson — Target POLARIS

Margin Forecast.Revenue * (1 + Overassign %.to Salesperson) / Salespeople Count per Product.Count
```

Cell Count: 210,800
Populated Cell Count: 57,409
Memory Used: 1.2 MB
Calculation Complexity: One-to-Many (307)
Calculation Effort: 97.4%

```
Target by Salesperson — Target with Valid Flag POLARIS

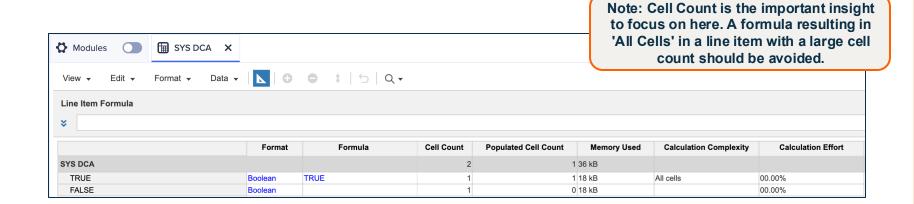
IF
Products by Salesperson.Valid Product
THEN
Margin Forecast.Revenue * (1 + Overassign %.to Salesperson) / Salespeople Count per Product.Count
ELSE
0
```

Cell Count: 210,800
Populated Cell Count: 442
Memory Used: 35 kB
Calculation Complexity: One-to-Many (12)
Calculation Effort: 02.60%

BEST PRACTICE: To optimize formula efficiency and reduce unnecessary calculations, minimize the use of One-to-Many calculations by reviewing the differing dimensionality, and/or using guards to lower the complexity factor (see "Guards" section for more detail).

## 'All cells' Calculation Complexity: An example

In this example, a Boolean is used where the formula consists of the value TRUE, which applies to all cells. When dealing with a substantial number of cells, the 'All cells' approach can negatively impact performance as the engine must calculate the value for each cell individually.



BEST PRACTICE: Avoid the 'All cells' approach in scenarios involving a substantial number of cells where performance is critical.

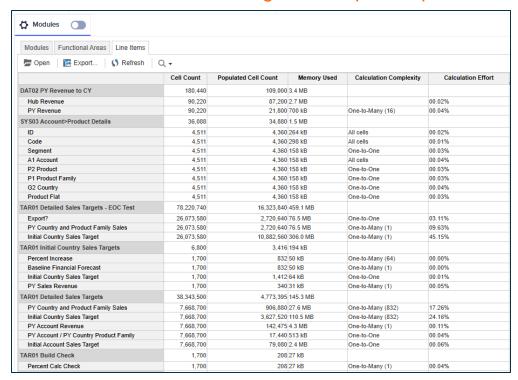


Watch this 5-minute video for a deep dive on **Calculation Complexity**.

## **Calculation Effort**

## How to determine which line items to optimize?

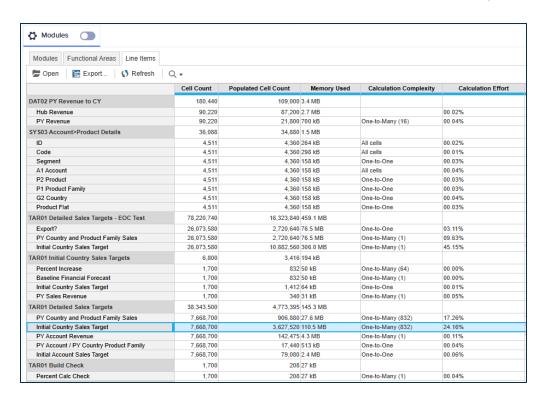
Blueprint Insights contain valuable information about line items, such as Calculation Effort. When reviewed together, Blueprint Insights can provide valuable information so you can focus on optimizing the line items that will have the greatest impact on performance.



consider: Of the line items shown, which Blueprint Insights stand out? Which line items might have the greatest opportunity for optimization?

## **Use Calculation Effort with Calculation Complexity to optimize formulas**

Calculation Effort and Calculation Complexity are Blueprint Insights contained within the blueprint view of a module (or the line items tab) in Polaris. Calculation effort displays the percentage of computational effort for each line item over the last ten minutes and responds to formula changes or user inputs.



## HOW TO REFRESH CALCULATION EFFORT:

- Full Model Refresh: close and reopen the model.
- 2. Targeted Update: allow model to remain idle for 10 minutes, then run the import actions or perform the user inputs. The Calculation Effort column on the line items affected will be updated.

## UNSURE HOW TO PRIORITIZE WHICH LINE ITEMS TO OPTIMIZE?

Check out this slide for guidance on how to prioritize based on Blueprint Insights.



Read this 5-minute article for more information on <u>Calculation Effort</u>.

## **Using Guards Effectively**

### What is a "guard"?

A "guard" refers to an IF THEN statement used in a formula with conditions to tell the Polaris engine when to calculate. When used appropriately, guards will tell the engine when to calculate and when to skip, which contributes to a more performant model.

#### **POLARIS IGNORES DEFAULTS**

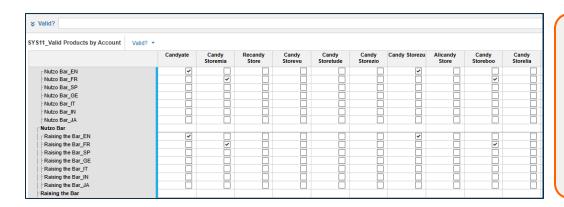
Polaris is already designed to minimize unnecessary calculations by skipping the default values of zero, blank and false, but it can only act on what it inherently knows.

When using guards to drive calculation efficiency, it's not as simple as just adding an IF THEN statement to formulas.

Thoughtful consideration about how and when to use guards is required.

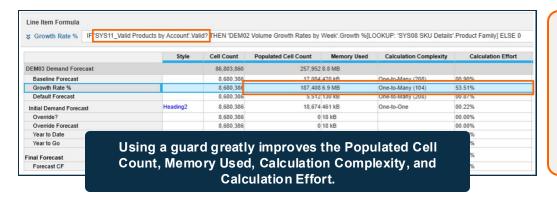
### **Validation Modules: A tool for effective guards**

A validation module is a small, targeted module that indicates intersections, such as which combinations of products and accounts, where a calculation should be performed.



#### **VALIDATION MODULE**

Contains the Boolean formatted line item 'Valid?' to indicate which combinations of products and accounts warrant a calculation, in this example the Growth Rate %, should be performed

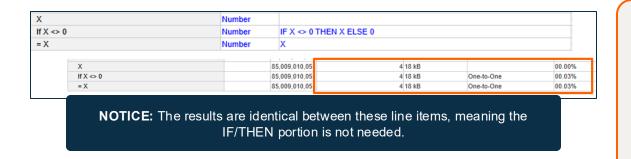


## INCORPORATING THE VALIDATION MODULE INTO A GUARD

The Growth Rate % formula has been updated to include an IF THEN ELSE statement that references the validation module. The calculation will only be performed for Product/Account combination where the Boolean is TRUE.

### All guards are not created equal

Thoughtful consideration should be used when deciding when to use a guard. Guards are not always recommended or required, and they can inadvertently "reverse" the sparsity of a line item.



	Time Range Versions	Style	Cell Count	Populated Cell Count	Memory Used	Calculation Complexity	Calculation Effort
EM03 Demand Forecast	Model Calendar Not Applicable		86,803,860	5,828,940	111.7 MB		
Baseline Forecast	Model Calendar Not Applicable		9,680,386	5,512	127 I/D	One to Many (208)	00.36%
Growth Rate %	Model Calendar Not Applicable		8,680,386	5,787,600	110.5 MB	All cells	82.98%
Default Forecast	Model Calendar Not Applicable	_	0,600,366	5,512	130 KB	One-to-wany (200)	00.35%
nitial Demand Forecast	Model Calendar Not Applicable	Heading2	8,680,386	7,102	177 kB	One-to-One	00.09%
Override?	Model Calendar Not Applicable		8,680,386	0	18 kB		00.00%
Override Forecast	Model Calendar Not Applicable		8,680,386	0	18 kB		00.00%
Year to Date	Model Calendar Not Applicable		8,680,386	5,512	130 kB	One-to-Many (104)	00.57%
Year to Go	Model Calendar Not Applicable		8 680 386	5.406	258 kB	One-to-Many (105)	01.06%

#### **UNNECESSARY GUARDS**

Some guards are redundant and add no performance benefit. In the Classic Anaplan engine, model builders often check for zeroes (a "<> 0" guard) to enable an early exit in IF statements. However, this isn't required in Polaris since the engine inherently ignores zero values.

#### **REVERSING SPARSITY**

Formulas that result in a value for many or most cells can result in high density and poor performance at high dimensionality. Examples include formulas with guards ending in "... ELSE X + 1" or "... ELSE TRUE".



For more detail, read this 5-minute article for information on Applying Formula Guards to Optimize Calculations.

## **Inline Conditions**

#### What is an "inline condition"?

An "inline condition" refers to a formula condition that is written in the formula itself to reduce calculation effort.

#### SPLITTING SUB-EXPRESSIONS VS. USING INLINE CONDITIONS

Splitting sub-expressions into separate line items allows them to be shared, which can be beneficial for performance and maintenance. However, this forces the engine to perform a full calculation that may not be needed.

Since Polaris evaluates the entire formula to determine the most efficient calculation path, inline conditions can be used to reduce calculation effort. This becomes increasingly important as model dimensionality grows.

The key to understanding inline conditions is understanding a "cross" or "cross product", which enumerates all the possible interactions of 2 or more things that aren't actually related.

	Mon	Tues	Wed	Thu	Fri	Sat	Sun
Is Weekday	T	T	T	T	T	F	F
	UK	France	Spain	USA	Canada	Mexico	
Speaks English	Т	F	F	T	T	F	

Line Item: Is Weekday = TRUE for days of the week

 Line Item: Speaks English = TRUE for countries whose primary language is English

	Veekday AND Speaks English								
	Mon	Tues	Wed	Thu	Fri	Sat	Sun		
UK	T	T	T	T	T	F	F		
France	F	F	F	F	F	F	F		
Spain	F	F	F	F	F	F	F		
USA	T	T	T	T	T	F	F		
Canada	T	T	T	T	T	F	F		
Mexico	F	F	F	F	F	F	F		

Another line item, Is Included, is added. This line item is a "cross".

## Using inline conditions vs. splitting out sub-expressions

Because **Is Included** is a separate line item, the engine is forced to calculate every cell in that line item. However, if we are using **Is Included** in another line item called **Target**, we can put the conditions from **Is Included** directly inline in the formula for **Target** to take advantage of Polaris ignoring defaults.

#### Target = IF Is Weekday AND Speaks English THEN Units Sold ELSE 0

Target = IF Is We	ekday AND	Speaks En	glish THEN	Units Sold	ELSE 0		
	Mon	Tues	Wed	Thu	Fri	Sat	Sun
UK				3			
France							
Spain							
USA	8						
Canada							
Mexico							

#### Units Sold (Zeros shown as blanks)

	Mon	Tues	Wed	Thu	Fri	Sat	Sun
UK				3			
France		5					
Spain			1				
USA	8						
Canada							6
Mexico							

The engine will only calculate Target for intersections where Units Sold, Is Weekday and Speaks English are all non-default, which is a much more efficient approach than calculating Is Included independently for all cells. However, this requires that the conditions for Is Included are used inline when calculating Target.

## Using inline conditions vs. splitting out sub-expressions (Continued)

The engine can only take the more efficient approach if the formula for **Is Included** is used inline when calculating **Target**. If it's instead its own line item, then the engine must calculate every combination.

Is Included split out (less performant):

Is Included = Is Weekday AND Speaks English
Target = IF Is Included THEN Units Sold ELSE 0

Is Included used inline (more performant):

Target = IF Is Weekday AND Speaks English THEN Units Sold ELSE 0

#### SO WHAT?

This example illustrates that, when deciding whether to use inline conditions or split sub-expressions into separate line items, you should look at **Calculation Complexity**. If you attempt to split out sub-expressions and...

- Calculation Complexity of the new line item is much higher, then you should use inline conditions,
- But if the calculation complexity is the same or less, then it's ok to split out into separate line items.

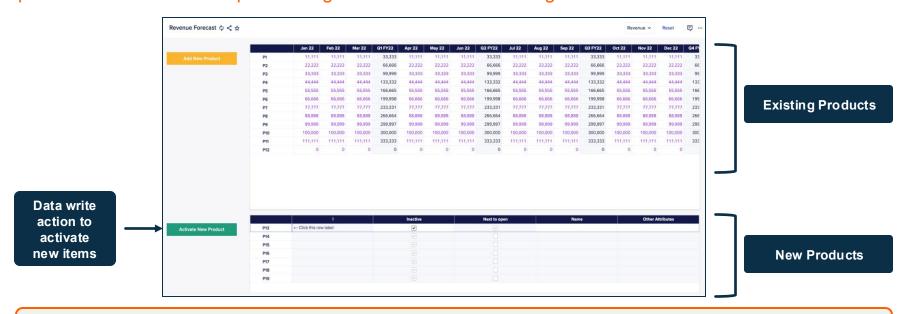


For more detail, read this 5-minute article for information on <a href="Optimizing">Optimizing</a>
<a href="Performance Using Inline Conditions">Performance Using Inline Conditions</a>.

## **Inserting List Members**

## Manage Impact to Performance When Adding New Dimension Members

Adding new dimension members to a list will cause a full recalculation of any module containing that list, which at high dimensionality in Polaris can be substantial. One approach to reducing impact on performance is to activate pre-existing dimension members using in cell data instead.

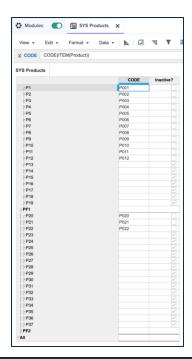


#### TIP 1: REVEAL NEW DIMENSION MEMBERS INDIVIDUALLY

Changing the value of a cell only recalculates formulas that refer to that cell. Use a Boolean as a filter to activate new members so the only recalculation happening is for the filter.

## Manage Impact to Performance When Adding New Dimension Members

It's important to include empty, inactive list members within parent levels by default as changing a list item's parent will also cause a full module recalculation.



#### TIP 2: ADD EMPTY, INACTIVE LIST MEMBERS IN ADVANCE

Anticipate where new dimension members may be needed by including empty, inactive list members in each parent level by default. These items won't show up in reports or impact calculations, but they will be readily available for use without causing a full recalculation of modules that contain that list.

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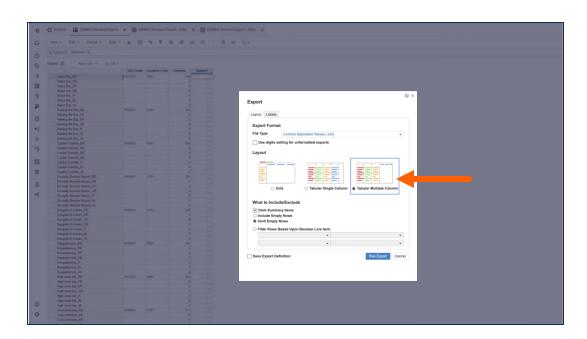


Watch this 5-minute video for an example of <u>Inserting List Members</u>.

## **Tabular Multiple Column Export**

### What is Tabular Multiple Column Export?

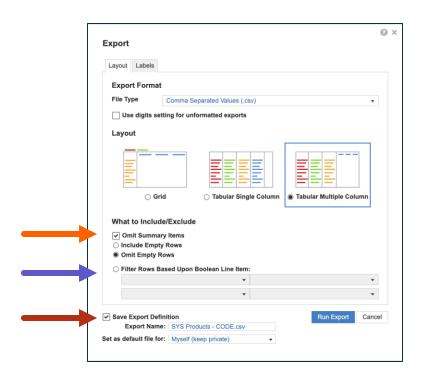
A more performant layout option for large exports that offers flexibility for future export maintenance, available in both Polaris and Classic



Leveraging the Tabular Multiple Column Export becomes even more important with Polaris, where datasets can be exponentially larger.

### Available settings when using Tabular Multiple Column Export

After switching the layout to Tabular Multiple Column, additional options will become available that can be applied to the export and saved within the export action



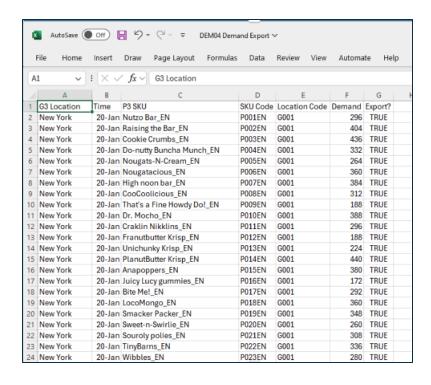
Omit Summary Items rather than using show/hide in the underlying module view for summary levels

Apply a filter within the action instead of within the module view

Save Export Definition saves all settings in the export action instead of within the module view, allowing easy updates in the future from the Actions pane

## Considerations when using a Tabular Multiple Column Export

When using the Tabular Multiple Column layout, it's important to consider what's included in the file and the file size, and if needed, leverage options to achieve the desired output



Only the rows where the export Boolean is true are included – the action is more flexible, with additional filters applied in the future as needed.

Tabular Multiple Column will export all line items within the module. If this isn't the desired behavior, create a separate model with only the necessary line items, as well as a separate module housing the export Boolean.

If the file size is large, use a separate filter module to keep the file size down.



Watch this 3-minute video for an example of <u>Tabular Multiple Column</u> <u>Export</u>.

Be the Next.